


**Utah Division of Water Quality**

**Statement of Basis**

**ADDENDUM**

**Wasteload Analysis and Antidegradation Level I Review - PRELIMINARY**

**Date:** January 5, 2016

**Prepared by:** Dave Wham   
Standards and Technical Services

**Facility:** Kamas Lagoons  
UPDES No. UT-0020966

**Receiving water:** Beaver Creek (1C, 2B, 3A, 4)

This addendum summarizes the wasteload analysis that was performed to determine water quality based effluent limits (WQBEL) for this discharge. Wasteload analyses are performed to determine point source effluent limitations necessary to maintain designated beneficial uses by evaluating projected effects of discharge concentrations on in-stream water quality. The wasteload analysis also takes into account downstream designated uses (UAC R317-2-8). Projected concentrations are compared to numeric water quality standards to determine acceptability. The numeric criteria in this wasteload analysis may be modified by narrative criteria and other conditions determined by staff of the Division of Water Quality.

Discharge

Outfall 001: Unnamed Ditch → Beaver Creek

The mean monthly design discharge is 1.0 MGD (1.5 cfs) for the facility.

Receiving Water

The receiving water for Outfall 001 is Beaver Creek.

Per UAC R317-2-13.4, the designated beneficial uses for Weber River and tributaries, from Stoddard diversion to headwaters, is 1C, 2B, 3A, and 4.

- *Class 1C - Protected for domestic purposes with prior treatment by treatment processes as required by the Utah Division of Drinking Water*
- *Class 2B - Protected for infrequent primary contact recreation. Also protected for secondary contact recreation where there is a low likelihood of ingestion of water or a low degree of bodily contact with the water. Examples include, but are not limited to, wading, hunting, and fishing.*
- *Class 3A - Protected for cold water species of game fish and other cold water aquatic life, including the necessary aquatic organisms in their food chain.*

- *Class 4 - Protected for agricultural uses including irrigation of crops and stock watering.*

Typically, the critical flow for the wasteload analysis is considered the lowest stream flow for seven consecutive days with a ten year return frequency (7Q10). Unfortunately, no flow data is available to adequately characterize the low flow condition in the receiving water. Previous analyses used station 4928530 – Beaver Creek above Weber-Provo Canal for calculating flow inputs. However, Provo River Water Users (PRWU) operates a major diversion on Beaver Creek immediately downstream of this station. As such, this station is not appropriate to use for flow data. Representatives of PRWU stated that they legally can divert all the water but that usually a small flow still goes into Beaver Creek below the diversion; something on the order of 1-3 cfs. The diversion has been in place since 1921 and the hydrology of Beaver Creek is highly modified below that point with many branching channels and ditches carrying water many different way in response to irrigation needs.

Kamas City pipes their discharge about 100 yards to the west of the lagoons where it daylights to a ditch. From here the discharge runs approximately 1.4 miles to the NW where it enters Beaver Creek. Beaver Creek at this point has accrued significantly more flow from various tributary streams, groundwater and ditch inflows throughout the valley. The proposed permit is a simple renewal with no increases to flow or concentrations. Based on site visit and consideration of additional information, I have determined that the previous WLA receiving water 7Q10 flow estimate of 2.42 cfs is sufficiently conservative to carry it over to the current permit.

**Table 1: Seasonal critical low flow (cfs)**

Season	Beaver Creek below Kamas City Lagoons 4946450
Annual	2.42 cfs

Beaver Creek water quality was characterized based on samples collected from monitoring station 4928530 – Beaver Creek above Weber-Provo Canal - for the period 1999 -2009.

#### TMDL

Rockport Reservoir is listed as impaired due to violations of the cold-water fishery dissolved oxygen (DO) standards. Rockport Reservoir was first listed 303(d) list in 2008. A TMDL was completed for Rockport Reservoir on September 16<sup>th</sup>, 2014 (UDWQ 2014). The TMDL identified the following load allocations applied to Kamas Lagoons for total nitrogen and total phosphorous:

**Table 2: TMDL Total Nitrogen and Phosphorous Load Allocations**

Load	Total Nitrogen (kg)	Total Phosphorous (kg)
Annual	5,542	554
Summer Season (Apr. 1st – Sept. 30 <sup>th</sup> )	2,771	277

#### Mixing Zone

The maximum allowable mixing zone is 15 minutes of travel time for acute conditions, not to exceed 50% of stream width, and 2,500 feet for chronic conditions, per UAC R317-2-5. Water quality standards must be met at the end of the mixing zone.

Since the receiving water low flow (2.42 cfs) is equal to or less than twice the flow of a point source discharge (1.5 cfs), the combined flows are considered to be totally mixed. Acute limits were calculated using 50% of the seasonal critical low flow.

#### Parameters of Concern

The potential parameters of concern identified for the discharge/receiving water were total ammonia, total residual chlorine, total phosphorous and total nitrogen as determined in consultation with the UPDES Permit Writer and the Weber River Watershed Coordinator.

#### WET Limits

The percent of effluent in the receiving water in a fully mixed condition, and acute and chronic dilution in a not fully mixed condition are calculated in the WLA in order to generate WET limits. The LC<sub>50</sub> (lethal concentration, 50%) percent effluent for acute toxicity and the IC<sub>25</sub> (inhibition concentration, 25%) percent effluent for chronic toxicity, as determined by the WET test, needs to be below the WET limits, as determined by the WLA. The WET limit for LC<sub>50</sub> is typically 100% effluent and does not need to be determined by the WLA.

**Table 3: WET Limits for IC<sub>25</sub>**

Outfall	Percent Effluent
Outfall 001	39%

#### Wasteload Allocation Methods

Effluent limits were determined for conservative constituents using a simple mass balance mixing analysis (UDWQ 2012). The mass balance analysis is summarized in the Wasteload Addendum.

Effluent limits for total phosphorous and nitrogen are based on the approved Rockport Reservoir TMDL (UDWQ 2014).

The water quality standard for chronic ammonia toxicity is dependent on temperature and pH, and the water quality standard for acute ammonia toxicity is dependent on pH. The AMMTOX Model developed by University of Colorado and adapted by Utah DWQ and EPA Region VIII was used to determine ammonia effluent limits (Lewis et al. 2002). The analysis is summarized in the Wasteload Addendum.

Effluent Limits

**Table 4: Water Quality Based Effluent Limits Summary**

Constituent	Acute		Chronic	
	Limit	Averaging Period	Limit	Averaging Period
Flow Outfall 001 (MGD)	1.0	30 days	1.0	30 days
Ammonia (mg/L)				30 days
Summer	12.8	1 hour	6.0	30 days
Fall	8.0		3.6	30 days
Winter	12.9		5.1	30 days
Spring	8.0		3.5	30 days
Total residual chlorine (mg/L)	.047	1 hour	.027	30 days

Models and supporting documentation are available for review upon request.

Antidegradation Level I Review

The objective of the Level I ADR is to ensure the protection of existing uses, defined as the beneficial uses attained in the receiving water on or after November 28, 1975. No evidence is known that the existing uses deviate from the designated beneficial uses for the receiving water. Therefore, the beneficial uses will be protected if the discharge remains below the WQBELs presented in this wasteload.

A Level II Antidegradation Review (ADR) is required for this facility because it discharges to a 1C drinking water source as outlined in R317-2-3.5d.

Documents:

WLA Document: *Kamas\_WLADoc\_1-5-16.docx*

Wasteload Analysis and Addendum: *Kamas\_WLA\_12-15-15.xlsm*

References:

Utah Division of Water Quality. 2012. *Utah Wasteload Analysis Procedures Version 1.0.*

Utah Division of Water Quality. 2014. Rockport Reservoir and Echo Reservoir Echo Reservoir Total Maximum Daily Loads. SWCA Environmental Consultants.

Lewis, B., J. Saunders, and M. Murphy. 2002. *Ammonia Toxicity Model (AMMTOX, Version2): A Tool for Determining Effluent Ammonia Limits.* University of Colorado, Center for Limnology.

# WASTELOAD ANALYSIS [WLA] Addendum: Statement of Basis SUMMARY

**Discharging Facility: Kamas Lagoons**

UPDES No: UT-0020966  
Current Flow: 1.00 MGD Design Flow  
Design Flow 1.00 MGD

**Receiving Water: Ditch => Beaver Creek**

Stream Classification: 1C, 2A, 3B, 4  
Stream Flows [cfs]:  
2.4 Summer (July-Sept) 20th Percentile  
2.4 Fall (Oct-Dec) 20th Percentile  
2.4 Winter (Jan-Mar) 20th Percentile  
2.4 Spring (Apr-June) 20th Percentile  
11.3 Average  
Stream TDS Values:  
135.2 Summer (July-Sept) Average  
210.4 Fall (Oct-Dec) Average  
204.0 Winter (Jan-Mar) Average  
227.0 Spring (Apr-June) Average

**Effluent Limits:**

Flow, MGD: 1.00 MGD Design Flow  
BOD, mg/l: 25.0 Summer 5.0 Indicator  
Dissolved Oxygen, mg/l: 5.0 Summer 6.5 30 Day Average  
TNH<sub>3</sub>, Chronic, mg/l: 6.0 Summer Varies Function of pH and Temperature  
TDS, mg/l: 2865.7 Summer 1200.0

**WQ Standard:****Modeling Parameters:**

Acute River Width: 50.0%  
Chronic River Width: 100.0%

Level 1 Antidegradation Level Completed: Level II Review is required. Receiving waterbody is a class 1C drinking w

Date: 1/4/2016

Permit Writer:

WLA by:

WQM Sec. Approval:

TMDL Sec. Approval:

Utah Division of Water Quality  
Salt Lake City, Utah

**WASTELOAD ANALYSIS [WLA]**  
**Addendum: Statement of Basis**

4-Jan-16
4:00 PM

**Facilities:** Kamas Lagoons  
**Discharging to:** Ditch => Beaver Creek

**UPDES No:** UT-0020966

**I. Introduction**

Wasteload analyses are performed to determine point source effluent limitations necessary to maintain designated beneficial uses by evaluating projected effects of discharge concentrations on in-stream water quality. The wasteload analysis also takes into account downstream designated uses [R317-2-8, UAC]. Projected concentrations are compared to numeric water quality standards to determine acceptability. The anti-degradation policy and procedures are also considered. The primary in-stream parameters of concern may include metals (as a function of hardness), total dissolved solids (TDS), total residual chlorine (TRC), un-ionized ammonia (as a function of pH and temperature, measured and evaluated in terms of total ammonia), and dissolved oxygen.

Mathematical water quality modeling is employed to determine stream quality response to point source discharges. Models aid in the effort of anticipating stream quality at future effluent flows at critical environmental conditions (e.g., low stream flow, high temperature, high pH, etc).

The numeric criteria in this wasteload analysis may always be modified by narrative criteria and other conditions determined by staff of the Division of Water Quality.

**II. Receiving Water and Stream Classification**

Ditch => Beaver Creek:	1C, 2A, 3B, 4
Antidegradation Review:	Level I review completed. Level II review required.

**III. Numeric Stream Standards for Protection of Aquatic Wildlife**

Total Ammonia (TNH3)	Varies as a function of Temperature and pH Rebound. See Water Quality Standards
Chronic Total Residual Chlorine (TRC)	0.011 mg/l (4 Day Average) 0.019 mg/l (1 Hour Average)
Chronic Dissolved Oxygen (DO)	6.50 mg/l (30 Day Average) 5.00 mg/l (7 Day Average) 4.00 mg/l (1 Day Average)
Maximum Total Dissolved Solids	1200.0 mg/l

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**Acute and Chronic Heavy Metals (Dissolved)**

Parameter	4 Day Average (Chronic) Standard		1 Hour Average (Acute) Standard		
	Concentration	Load*	Concentration		Load*
Aluminum	87.00 ug/l**	0.725 lbs/day	750.00	ug/l	6.254 lbs/day
Arsenic	190.00 ug/l	1.584 lbs/day	340.00	ug/l	2.835 lbs/day
Cadmium	0.41 ug/l	0.003 lbs/day	3.80	ug/l	0.032 lbs/day
Chromium III	137.17 ug/l	1.144 lbs/day	2869.95	ug/l	23.931 lbs/day
ChromiumVI	11.00 ug/l	0.092 lbs/day	16.00	ug/l	0.133 lbs/day
Copper	15.15 ug/l	0.126 lbs/day	23.90	ug/l	0.199 lbs/day
Iron			1000.00	ug/l	8.338 lbs/day
Lead	6.55 ug/l	0.055 lbs/day	168.15	ug/l	1.402 lbs/day
Mercury	0.0120 ug/l	0.000 lbs/day	2.40	ug/l	0.020 lbs/day
Nickel	84.31 ug/l	0.703 lbs/day	758.33	ug/l	6.323 lbs/day
Selenium	4.60 ug/l	0.038 lbs/day	20.00	ug/l	0.167 lbs/day
Silver	N/A ug/l	N/A lbs/day	10.04	ug/l	0.084 lbs/day
Zinc	193.80 ug/l	1.616 lbs/day	193.80	ug/l	1.616 lbs/day

\* Allowed below discharge

\*\*Chronic Aluminum standard applies only to waters with a pH < 7.0 and a Hardness < 50 mg/l as CaCO<sub>3</sub>

Metals Standards Based upon a Hardness of 176.39 mg/l as CaCO<sub>3</sub>

**Organics [Pesticides]**

Parameter	4 Day Average (Chronic) Standard		1 Hour Average (Acute) Standard		
	Concentration	Load*	Concentration		Load*
Aldrin			1.500	ug/l	0.013 lbs/day
Chlordane	0.004 ug/l	0.092 lbs/day	1.200	ug/l	0.010 lbs/day
DDT, DDE	0.001 ug/l	0.021 lbs/day	0.550	ug/l	0.005 lbs/day
Dieldrin	0.002 ug/l	0.041 lbs/day	1.250	ug/l	0.010 lbs/day
Endosulfan	0.056 ug/l	1.197 lbs/day	0.110	ug/l	0.001 lbs/day
Endrin	0.002 ug/l	0.049 lbs/day	0.090	ug/l	0.001 lbs/day
Guthion			0.010	ug/l	0.000 lbs/day
Heptachlor	0.004 ug/l	0.081 lbs/day	0.260	ug/l	0.002 lbs/day
Lindane	0.080 ug/l	1.711 lbs/day	1.000	ug/l	0.008 lbs/day
Methoxychlor			0.030	ug/l	0.000 lbs/day
Mirex			0.010	ug/l	0.000 lbs/day
Parathion			0.040	ug/l	0.000 lbs/day
PCB's	0.014 ug/l	0.299 lbs/day	2.000	ug/l	0.017 lbs/day
Pentachlorophenol	13.00 ug/l	277.968 lbs/day	20.000	ug/l	0.167 lbs/day
Toxephene	0.0002 ug/l	0.004 lbs/day	0.7300	ug/l	0.006 lbs/day

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**IV. Numeric Stream Standards for Protection of Agriculture**

4 Day Average (Chronic) Standard		1 Hour Average (Acute) Standard	
	Concentration	Concentration	Load*
Arsenic		100.0 ug/l	lbs/day
Boron		750.0 ug/l	3.13 lbs/day
Cadmium		10.0 ug/l	0.04 lbs/day
Chromium		100.0 ug/l	lbs/day
Copper		200.0 ug/l	lbs/day
Lead		100.0 ug/l	lbs/day
Selenium		50.0 ug/l	lbs/day
TDS, Summer		1200.0 mg/l	5.00 tons/day

**V. Numeric Stream Standards for Protection of Human Health (Class 1C Waters)**

Metals	4 Day Average (Chronic) Standard		1 Hour Average (Acute) Standard	
	Concentration	Load*	Concentration	Load*
Arsenic			50.0 ug/l	1.069 lbs/day
Barium			1000.0 ug/l	21.382 lbs/day
Cadmium			10.0 ug/l	0.214 lbs/day
Chromium			50.0 ug/l	1.069 lbs/day
Lead			50.0 ug/l	1.069 lbs/day
Mercury			2.0 ug/l	0.043 lbs/day
Selenium			10.0 ug/l	0.214 lbs/day
Silver			50.0 ug/l	1.069 lbs/day
Fluoride (3)			1.4 ug/l	0.030 lbs/day
to			2.4 ug/l	0.051 lbs/day
Nitrates as N			10.0 ug/l	0.214 lbs/day

**Chlorophenoxy Herbicides**

2,4-D	100.0 ug/l	2.138 lbs/day
2,4,5-TP	10.0 ug/l	0.214 lbs/day
Endrin	0.2 ug/l	0.004 lbs/day
ocyclohexane (Lindane)	4.0 ug/l	0.086 lbs/day
Methoxychlor	100.0 ug/l	2.138 lbs/day
Toxaphene	5.0 ug/l	0.107 lbs/day

**VI. Numeric Stream Standards the Protection of Human Health from Water & Fish Consumption [Toxics]**

Toxic Organics	Maximum Conc., ug/l - Acute Standards			
	Class 1C [2 Liters/Day for 70 Kg Person over 70 Yr.]		Class 3A, 3B [6.5 g for 70 Kg Person over 70 Yr.]	
Acenaphthene	1200.00 ug/l	25.66 lbs/day	2700.0 ug/l	57.73 lbs/day
Acrolein	320.00 ug/l	6.84 lbs/day	780.0 ug/l	16.68 lbs/day
Acrylonitrile	0.06 ug/l	0.00 lbs/day	0.7 ug/l	0.01 lbs/day
Benzene	1.20 ug/l	0.03 lbs/day	71.0 ug/l	1.52 lbs/day
Benzidine	0.00012 ug/l	0.00 lbs/day	0.0 ug/l	0.00 lbs/day
Carbon tetrachloride	0.25 ug/l	0.01 lbs/day	4.4 ug/l	0.09 lbs/day
Chlorobenzene	680.00 ug/l	14.54 lbs/day	21000.0 ug/l	449.02 lbs/day
1,2,4-Trichlorobenzene				
Hexachlorobenzene	0.00075 ug/l	0.00 lbs/day	0.0 ug/l	0.00 lbs/day
1,2-Dichloroethane	0.38 ug/l	0.01 lbs/day	99.0 ug/l	2.12 lbs/day



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1,1,1-Trichloroethane				
Hexachloroethane	1.90 ug/l	0.04 lbs/day	8.9 ug/l	0.19 lbs/day
1,1-Dichloroethane				
1,1,2-Trichloroethane	0.61 ug/l	0.01 lbs/day	42.0 ug/l	0.90 lbs/day
1,1,2,2-Tetrachloroethane	0.17 ug/l	0.00 lbs/day	11.0 ug/l	0.24 lbs/day
Chloroethane			0.0 ug/l	0.00 lbs/day
Bis(2-chloroethyl) ether	0.03 ug/l	0.00 lbs/day	1.4 ug/l	0.03 lbs/day
2-Chloroethyl vinyl ether	0.00 ug/l	0.00 lbs/day	0.0 ug/l	0.00 lbs/day
2-Chloronaphthalene	1700.00 ug/l	36.35 lbs/day	4300.0 ug/l	91.94 lbs/day
2,4,6-Trichlorophenol	2.10 ug/l	0.04 lbs/day	6.5 ug/l	0.14 lbs/day
p-Chloro-m-cresol			0.0 ug/l	0.00 lbs/day
Chloroform (HM)	5.70 ug/l	0.12 lbs/day	470.0 ug/l	10.05 lbs/day
2-Chlorophenol	120.00 ug/l	2.57 lbs/day	400.0 ug/l	8.55 lbs/day
1,2-Dichlorobenzene	2700.00 ug/l	57.73 lbs/day	17000.0 ug/l	363.50 lbs/day
1,3-Dichlorobenzene	400.00 ug/l	8.55 lbs/day	2600.0 ug/l	55.59 lbs/day
1,4-Dichlorobenzene	400.00 ug/l	8.55 lbs/day	2600.0 ug/l	55.59 lbs/day
3,3'-Dichlorobenzidine	0.04 ug/l	0.00 lbs/day	0.1 ug/l	0.00 lbs/day
1,1-Dichloroethylene	0.06 ug/l	0.00 lbs/day	3.2 ug/l	0.07 lbs/day
1,2-trans-Dichloroethylene	700.00 ug/l	14.97 lbs/day	0.0 ug/l	0.00 lbs/day
2,4-Dichlorophenol	93.00 ug/l	1.99 lbs/day	790.0 ug/l	16.89 lbs/day
1,2-Dichloropropane	0.52 ug/l	0.01 lbs/day	39.0 ug/l	0.83 lbs/day
1,3-Dichloropropylene	10.00 ug/l	0.21 lbs/day	1700.0 ug/l	36.35 lbs/day
2,4-Dimethylphenol	540.00 ug/l	11.55 lbs/day	2300.0 ug/l	49.18 lbs/day
2,4-Dinitrotoluene	0.11 ug/l	0.00 lbs/day	9.1 ug/l	0.19 lbs/day
2,6-Dinitrotoluene	0.00 ug/l	0.00 lbs/day	0.0 ug/l	0.00 lbs/day
1,2-Diphenylhydrazine	0.04 ug/l	0.00 lbs/day	0.5 ug/l	0.01 lbs/day
Ethylbenzene	3100.00 ug/l	66.28 lbs/day	29000.0 ug/l	620.08 lbs/day
Fluoranthene	300.00 ug/l	6.41 lbs/day	370.0 ug/l	7.91 lbs/day
4-Chlorophenyl phenyl ether				
4-Bromophenyl phenyl ether				
Bis(2-chloroisopropyl) ether	1400.00 ug/l	29.93 lbs/day	170000.0 ug/l	3634.96 lbs/day
Bis(2-chloroethoxy) methane	0.00 ug/l	0.00 lbs/day	0.0 ug/l	0.00 lbs/day
Methylene chloride (HM)	4.70 ug/l	0.10 lbs/day	1600.0 ug/l	34.21 lbs/day
Methyl chloride (HM)	0.00 ug/l	0.00 lbs/day	0.0 ug/l	0.00 lbs/day
Methyl bromide (HM)	0.00 ug/l	0.00 lbs/day	0.0 ug/l	0.00 lbs/day
Bromoform (HM)	4.30 ug/l	0.09 lbs/day	360.0 ug/l	7.70 lbs/day
Dichlorobromomethane	0.27 ug/l	0.01 lbs/day	22.0 ug/l	0.47 lbs/day
Chlorodibromomethane	0.41 ug/l	0.01 lbs/day	34.0 ug/l	0.73 lbs/day
Hexachlorobutadiene(c)	0.44 ug/l	0.01 lbs/day	50.0 ug/l	1.07 lbs/day
Hexachlorocyclopentadiene	240.00 ug/l	5.13 lbs/day	17000.0 ug/l	363.50 lbs/day
Isophorone	8.40 ug/l	0.18 lbs/day	600.0 ug/l	12.83 lbs/day
Naphthalene				
Nitrobenzene	17.00 ug/l	0.36 lbs/day	1900.0 ug/l	40.63 lbs/day
2-Nitrophenol	0.00 ug/l	0.00 lbs/day	0.0 ug/l	0.00 lbs/day
4-Nitrophenol	0.00 ug/l	0.00 lbs/day	0.0 ug/l	0.00 lbs/day
2,4-Dinitrophenol	70.00 ug/l	1.50 lbs/day	14000.0 ug/l	299.35 lbs/day
4,6-Dinitro-o-cresol	13.00 ug/l	0.28 lbs/day	765.0 ug/l	16.36 lbs/day
N-Nitrosodimethylamine	0.00069 ug/l	0.00 lbs/day	8.1 ug/l	0.17 lbs/day
N-Nitrosodiphenylamine	5.00 ug/l	0.11 lbs/day	16.0 ug/l	0.34 lbs/day
N-Nitrosodi-n-propylamine	0.01 ug/l	0.00 lbs/day	1.4 ug/l	0.03 lbs/day
Pentachlorophenol	0.28 ug/l	0.01 lbs/day	8.2 ug/l	0.18 lbs/day

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Phenol	2.10E+04 ug/l	4.49E+02 lbs/day	4.6E+06 ug/l	9.84E+04 lbs/day
Bis(2-ethylhexyl)phthala	1.80 ug/l	0.04 lbs/day	5.9 ug/l	0.13 lbs/day
Butyl benzyl phthalate	3000.00 ug/l	64.15 lbs/day	5200.0 ug/l	111.19 lbs/day
Di-n-butyl phthalate	2700.00 ug/l	57.73 lbs/day	12000.0 ug/l	256.59 lbs/day
Di-n-octyl phthlate				
Diethyl phthalate	23000.00 ug/l	491.79 lbs/day	120000.0 ug/l	2565.86 lbs/day
Dimethyl phthlate	3.13E+05 ug/l	6.69E+03 lbs/day	2.9E+06 ug/l	6.20E+04 lbs/day
Benzo(a)anthracene (P/	0.0028 ug/l	0.00 lbs/day	0.0 ug/l	0.00 lbs/day
Benzo(a)pyrene (PAH)	0.0028 ug/l	0.00 lbs/day	0.0 ug/l	0.00 lbs/day
Benzo(b)fluoranthene (F	0.0028 ug/l	0.00 lbs/day	0.0 ug/l	0.00 lbs/day
Benzo(k)fluoranthene (F	0.0028 ug/l	0.00 lbs/day	0.0 ug/l	0.00 lbs/day
Chrysene (PAH)	0.0028 ug/l	0.00 lbs/day	0.0 ug/l	0.00 lbs/day
Acenaphthylene (PAH)				
Anthracene (PAH)	9600.00 ug/l	205.27 lbs/day	0.0 ug/l	0.00 lbs/day
Dibenzo(a,h)anthracene	0.0028 ug/l	0.00 lbs/day	0.0 ug/l	0.00 lbs/day
Indeno(1,2,3-cd)pyrene	0.0028 ug/l	0.00 lbs/day	0.0 ug/l	0.00 lbs/day
Pyrene (PAH)	960.00 ug/l	20.53 lbs/day	11000.0 ug/l	235.20 lbs/day
Tetrachloroethylene	0.80 ug/l	0.02 lbs/day	8.9 ug/l	0.19 lbs/day
Toluene	6800.00 ug/l	145.40 lbs/day	200000 ug/l	4276.43 lbs/day
Trichloroethylene	2.70 ug/l	0.06 lbs/day	81.0 ug/l	1.73 lbs/day
Vinyl chloride	2.00 ug/l	0.04 lbs/day	525.0 ug/l	11.23 lbs/day
			0.0	0.00 lbs/day
<b>Pesticides</b>			0.0	0.00 lbs/day
Aldrin	0.0001 ug/l	0.00 lbs/day	0.0 ug/l	0.00 lbs/day
Dieldrin	0.0001 ug/l	0.00 lbs/day	0.0 ug/l	0.00 lbs/day
Chlordane	0.0006 ug/l	0.00 lbs/day	0.0 ug/l	0.00 lbs/day
4,4'-DDT	0.0006 ug/l	0.00 lbs/day	0.0 ug/l	0.00 lbs/day
4,4'-DDE	0.0006 ug/l	0.00 lbs/day	0.0 ug/l	0.00 lbs/day
4,4'-DDD	0.0008 ug/l	0.00 lbs/day	0.0 ug/l	0.00 lbs/day
alpha-Endosulfan	0.9300 ug/l	0.02 lbs/day	2.0 ug/l	0.04 lbs/day
beta-Endosulfan	0.9300 ug/l	0.02 lbs/day	2.0 ug/l	0.04 lbs/day
Endosulfan sulfate	0.9300 ug/l	0.02 lbs/day	2.0 ug/l	0.04 lbs/day
Endrin	0.7600 ug/l	0.02 lbs/day	0.8 ug/l	0.02 lbs/day
Endrin aldehyde	0.7600 ug/l	0.02 lbs/day	0.8 ug/l	0.02 lbs/day
Heptachlor	0.0002 ug/l	0.00 lbs/day	0.0 ug/l	0.00 lbs/day
Heptachlor epoxide				
<b>PCB's</b>				
PCB 1242 (Arochlor 124	0.000044 ug/l	0.00 lbs/day	0.0 ug/l	0.00 lbs/day
PCB-1254 (Arochlor 124	0.000044 ug/l	0.00 lbs/day	0.0 ug/l	0.00 lbs/day
PCB-1221 (Arochlor 122	0.000044 ug/l	0.00 lbs/day	0.0 ug/l	0.00 lbs/day
PCB-1232 (Arochlor 123	0.000044 ug/l	0.00 lbs/day	0.0 ug/l	0.00 lbs/day
PCB-1248 (Arochlor 124	0.000044 ug/l	0.00 lbs/day	0.0 ug/l	0.00 lbs/day
PCB-1260 (Arochlor 126	0.000044 ug/l	0.00 lbs/day	0.0 ug/l	0.00 lbs/day
PCB-1016 (Arochlor 101	0.000044 ug/l	0.00 lbs/day	0.0 ug/l	0.00 lbs/day
<b>Pesticide</b>				
Toxaphene	0.000750 ug/l	0.00	0.0 ug/l	0.00 lbs/day
<b>Dioxin</b>				
Dioxin (2,3,7,8-TCDD)	1.30E-08 ug/l	0.00 lbs/day	1.40E-08	0.00

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**Metals**

Antimony	14.0 ug/l	0.30 lbs/day		
Arsenic	50.0 ug/l	1.07 lbs/day	4300.00 ug/l	91.94 lbs/day
Asbestos	7.00E+06 ug/l	1.50E+05 lbs/day		
Beryllium				
Cadmium				
Chromium (III)				
Chromium (VI)				
Copper				
Cyanide	1.30E+03 ug/l	27.80 lbs/day	2.2E+05 ug/l	4704.07 lbs/day
Lead	700.0 ug/l	14.97 lbs/day		
Mercury			0.15 ug/l	0.00 lbs/day
Nickel			4600.00 ug/l	98.36 lbs/day
Selenium	0.1 ug/l	0.00 lbs/day		
Silver	610.0 ug/l	13.04 lbs/day		
Thallium			6.30 ug/l	0.13 lbs/day
Zinc				

**There are additional standards that apply to this receiving water, but were not considered in this modeling/waste load allocation analysis.**

## **VII. Mathematical Modeling of Stream Quality**

Model configuration was accomplished utilizing standard modeling procedures. Data points were plotted and coefficients adjusted as required to match observed data as closely as possible.

The modeling approach used in this analysis included one or a combination of the following models.

(1) The Utah River Model, Utah Division of Water Quality, 1992. Based upon STREAMDO IV (Region VIII) and Supplemental Ammonia Toxicity Models; EPA Region VIII, Sept. 1990 and QUAL2E (EPA, Athens, GA).

(2) Utah Ammonia/Chlorine Model, Utah Division of Water Quality, 1992.

(3) AMMTOX Model, University of Colorado, Center of Limnology, and EPA Region 8

(4) Principles of Surface Water Quality Modeling and Control. Robert V. Thomann, et.al. Harper Collins Publisher, Inc. 1987, pp. 644.

Coefficients used in the model were based, in part, upon the following references:

(1) Rates, Constants, and Kinetics Formulations in Surface Water Quality Modeling. Environmental Research Laboratory, Office of Research and Development, U.S. Environmental Protection Agency, Athens Georgia. EPA/600/3-85/040 June 1985.

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(2) Principles of Surface Water Quality Modeling and Control. Robert V. Thomann, et.al.  
Harper Collins Publisher, Inc. 1987, pp. 644.

### VIII. Modeling Information

The required information for the model may include the following information for both the upstream conditions at low flow and the effluent conditions:

Flow, Q, (cfs or MGD)	D.O. mg/l
Temperature, Deg. C.	Total Residual Chlorine (TRC), mg/l
pH	Total NH3-N, mg/l
BOD5, mg/l	Total Dissolved Solids (TDS), mg/l
Metals, ug/l	Toxic Organics of Concern, ug/l

### Other Conditions

In addition to the upstream and effluent conditions, the models require a variety of physical and biological coefficients and other technical information. In the process of actually establishing the permit limits for an effluent, values are used based upon the available data, model calibration, literature values, site visits and best professional judgement.

### Model Inputs

The following is upstream and discharge information that was utilized as inputs for the analysis. Dry washes are considered to have an upstream flow equal to the flow of the discharge.

### Current Upstream Information

	Stream		pH	T-NH3 mg/l as N	BOD5 mg/l	DO mg/l	TRC mg/l	TDS mg/l
	Critical	Low						
	Flow cfs	Temp. Deg. C						
Summer (Irrig. Season)	2.4	15.4	8.4	0.07	0.50	7.07	0.00	135.2
Fall	2.4	4.1	8.4	0.07	0.50	---	0.00	210.4
Winter	2.4	4.5	8.3	0.07	0.50	---	0.00	210.4
Spring	2.4	9.0	7.9	0.07	0.50	---	0.00	210.4
Dissolved Metals	Al ug/l	As ug/l	Cd ug/l	CrIII ug/l	CrVI ug/l	Copper ug/l	Fe ug/l	Pb ug/l
All Seasons	1.59*	0.53*	0.053*	0.53*	2.65*	0.53*	0.83*	0.53*
Dissolved Metals	Hg ug/l	Ni ug/l	Se ug/l	Ag ug/l	Zn ug/l	Boron ug/l		
All Seasons	0.0000	0.53*	1.06*	0.1*	0.053*	10.0		* 1/2 MDL

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**Projected Discharge Information**

Season	Flow, MGD	Temp.	TDS mg/l	TDS tons/day
Summer	1.00000	16.7	468.00	1.95117
Fall	1.00000	5.2		
Winter	1.00000	2.8		
Spring	1.00000	13.8		

All model numerical inputs, intermediate calculations, outputs and graphs are available for discussion, inspection and copy at the Division of Water Quality.

**IX. Effluent Limitations**

Current State water quality standards are required to be met under a variety of conditions including in-stream flows targeted to the 7-day, 10-year low flow (R317-2-9).

Other conditions used in the modeling effort coincide with the environmental conditions expected at low stream flows.

**Effluent Limitation for Flow based upon Water Quality Standards**

In-stream criteria of downstream segments will be met with an effluent flow maximum value as follows:

Season	Daily Average	
Summer	1.000 MGD	1.547 cfs
Fall	1.000 MGD	1.547 cfs
Winter	1.000 MGD	1.547 cfs
Spring	1.000 MGD	1.547 cfs

**Flow Requirement or Loading Requirement**

The calculations in this wasteload analysis utilize the maximum effluent discharge flow of 1 MGD. If the discharger is allowed to have a flow greater than 1 MGD during 7Q10 conditions, and effluent limit concentrations as indicated, then water quality standards will be violated. In order to prevent this from occurring, the permit writers must include the discharge flow limitation as indicated above; or, include loading effluent limits in the permit.

**Effluent Limitation for Whole Effluent Toxicity (WET) based upon WET Policy**

Effluent Toxicity will not occur in downstream segments if the values below are met.

WET Requirements	LC50 >	EOP Effluent	[Acute]
	IC25 >	39.0% Effluent	[Chronic]

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**Effluent Limitation for Biological Oxygen Demand (BOD) based upon Water Quality Standards or Regulations**

In-stream criteria of downstream segments for Dissolved Oxygen will be met with an effluent BOD limitation as follows:

Season	Concentration	
Summer	25.0 mg/l as BOD5	208.5 lbs/day
Fall	25.0 mg/l as BOD5	208.5 lbs/day
Winter	25.0 mg/l as BOD5	208.5 lbs/day
Spring	25.0 mg/l as BOD5	208.5 lbs/day

**Effluent Limitation for Dissolved Oxygen (DO) based upon Water Quality Standards**

In-stream criteria of downstream segments for Dissolved Oxygen will be met with an effluent D.O. limitation as follows:

Season	Concentration
Summer	5.00
Fall	5.00
Winter	5.00
Spring	5.00

**Effluent Limitation for Total Ammonia based upon Water Quality Standards**

In-stream criteria of downstream segments for Total Ammonia will be met with an effluent limitation (expressed as Total Ammonia as N) as follows:

Season		Concentration	Load
Summer	4 Day Avg. - Chronic	6.0 mg/l as N	49.6 lbs/day
	1 Hour Avg. - Acute	12.8 mg/l as N	106.8 lbs/day
Fall	4 Day Avg. - Chronic	3.6 mg/l as N	30.4 lbs/day
	1 Hour Avg. - Acute	8.0 mg/l as N	66.7 lbs/day
Winter	4 Day Avg. - Chronic	5.1 mg/l as N	42.3 lbs/day
	1 Hour Avg. - Acute	12.9 mg/l as N	108.0 lbs/day
Spring	4 Day Avg. - Chronic	3.5 mg/l as N	29.3 lbs/day
	1 Hour Avg. - Acute	8.0 mg/l as N	66.7 lbs/day

Acute limit calculated with an Acute Zone of Initial Dilution (ZID) to be equal to 100. %.

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**Effluent Limitation for Total Residual Chlorine based upon Water Quality Standards**

In-stream criteria of downstream segments for Total Residual Chlorine will be met with an effluent limitation as follows:

Season		Concentration		Load	
Summer	4 Day Avg. - Chronic	0.027	mg/l	0.22	lbs/day
	1 Hour Avg. - Acute	0.047	mg/l	0.39	lbs/day
Fall	4 Day Avg. - Chronic	0.027	mg/l	0.22	lbs/day
	1 Hour Avg. - Acute	0.047	mg/l	0.39	lbs/day
Winter	4 Day Avg. - Chronic	0.027	mg/l	0.22	lbs/day
	1 Hour Avg. - Acute	0.047	mg/l	0.39	lbs/day
Spring	4 Day Avg. - Chronic	0.027	mg/l	0.00	lbs/day
	1 Hour Avg. - Acute	0.047	mg/l	0.00	lbs/day

**Effluent Limitations for Total Dissolved Solids based upon Water Quality Standards**

Season		Concentration		Load	
Summer	Maximum, Acute	2865.7	mg/l	11.95	tons/day
Fall	Maximum, Acute	2748.0	mg/l	11.46	tons/day
Winter	Maximum, Acute	2758.1	mg/l	11.50	tons/day
Spring	4 Day Avg. - Chronic	2722.1	mg/l	11.35	tons/day

Colorado Salinity Forum Limits      Determined by Permitting Section

**Effluent Limitations for Total Recoverable Metals based upon Water Quality Standards**

In-stream criteria of downstream segments for Dissolved Metals will be met with an effluent limitation as follows (based upon a hardness of 176.39 mg/l):

	4 Day Average		Load	1 Hour Average		Load
	Concentration			Concentration		
Aluminum	N/A		N/A	1,334.8	ug/l	11.1 lbs/day
Arsenic	485.98	ug/l	2.6 lbs/day	605.3	ug/l	5.0 lbs/day
Cadmium	0.93	ug/l	0.0 lbs/day	6.7	ug/l	0.1 lbs/day
Chromium III	350.51	ug/l	1.9 lbs/day	5,114.1	ug/l	42.6 lbs/day
Chromium VI	21.99	ug/l	0.1 lbs/day	25.4	ug/l	0.2 lbs/day
Copper	37.61	ug/l	0.2 lbs/day	42.0	ug/l	0.3 lbs/day
Iron	N/A		N/A	1,781.2	ug/l	14.9 lbs/day
Lead	15.56	ug/l	0.1 lbs/day	299.1	ug/l	2.5 lbs/day
Mercury	0.03	ug/l	0.0 lbs/day	4.3	ug/l	0.0 lbs/day
Nickel	214.96	ug/l	1.2 lbs/day	1,350.8	ug/l	11.3 lbs/day
Selenium	9.31	ug/l	0.1 lbs/day	34.4	ug/l	0.3 lbs/day
Silver	N/A	ug/l	N/A lbs/day	17.9	ug/l	0.1 lbs/day

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Zinc	496.85 ug/l	2.7 lbs/day	345.3 ug/l	2.9 lbs/day
Cyanide	13.33 ug/l	0.1 lbs/day	39.2 ug/l	0.3 lbs/day

**Effluent Limitations for Heat/Temperature based upon  
Water Quality Standards**

Summer	20.5 Deg. C.	68.9 Deg. F
Fall	9.3 Deg. C.	48.7 Deg. F
Winter	9.7 Deg. C.	49.4 Deg. F
Spring	14.1 Deg. C.	57.4 Deg. F

**Effluent Limitations for Organics [Pesticides]  
Based upon Water Quality Standards**

In-stream criteria of downstream segments for Organics [Pesticides]  
will be met with an effluent limit as follows:

	4 Day Average		1 Hour Average	
	Concentration	Load	Concentration	Load
Aldrin			1.5E+00 ug/l	1.93E-02 lbs/day
Chlordane	4.30E-03 ug/l	3.59E-02 lbs/day	1.2E+00 ug/l	1.55E-02 lbs/day
DDT, DDE	1.00E-03 ug/l	8.34E-03 lbs/day	5.5E-01 ug/l	7.09E-03 lbs/day
Dieldrin	1.90E-03 ug/l	1.58E-02 lbs/day	1.3E+00 ug/l	1.61E-02 lbs/day
Endosulfan	5.60E-02 ug/l	4.67E-01 lbs/day	1.1E-01 ug/l	1.42E-03 lbs/day
Endrin	2.30E-03 ug/l	1.92E-02 lbs/day	9.0E-02 ug/l	1.16E-03 lbs/day
Guthion	0.00E+00 ug/l	0.00E+00 lbs/day	1.0E-02 ug/l	1.29E-04 lbs/day
Heptachlor	3.80E-03 ug/l	3.17E-02 lbs/day	2.6E-01 ug/l	3.35E-03 lbs/day
Lindane	8.00E-02 ug/l	6.67E-01 lbs/day	1.0E+00 ug/l	1.29E-02 lbs/day
Methoxychlor	0.00E+00 ug/l	0.00E+00 lbs/day	3.0E-02 ug/l	3.87E-04 lbs/day
Mirex	0.00E+00 ug/l	0.00E+00 lbs/day	1.0E-02 ug/l	1.29E-04 lbs/day
Parathion	0.00E+00 ug/l	0.00E+00 lbs/day	4.0E-02 ug/l	5.16E-04 lbs/day
PCB's	1.40E-02 ug/l	1.17E-01 lbs/day	2.0E+00 ug/l	2.58E-02 lbs/day
Pentachlorophenol	1.30E+01 ug/l	1.08E+02 lbs/day	2.0E+01 ug/l	2.58E-01 lbs/day
Toxephene	2.00E-04 ug/l	1.67E-03 lbs/day	7.3E-01 ug/l	9.42E-03 lbs/day



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**Effluent Targets for Pollution Indicators  
Based upon Water Quality Standards**

In-stream criteria of downstream segments for Pollution Indicators will be met with an effluent limit as follows:

	<b>1 Hour Average</b>	
	Concentration	Loading
Gross Beta (pCi/l)	50.0 pCi/L	
BOD (mg/l)	5.0 mg/l	41.7 lbs/day
Nitrates as N	4.0 mg/l	33.4 lbs/day
Total Phosphorus as P	0.05 mg/l	0.4 lbs/day
Total Suspended Solids	90.0 mg/l	750.4 lbs/day

Note: Pollution indicator targets are for information purposes only.

**Effluent Limitations for Protection of Human Health [Toxics Rule]  
Based upon Water Quality Standards (Most stringent of 1C or 3A & 3B as appropriate.)**

In-stream criteria of downstream segments for Protection of Human Health [Toxics] will be met with an effluent limit as follows:

	<b>Maximum Concentration</b>	
	Concentration	Load
<b>Toxic Organics</b>		
Acenaphthene	3.08E+03 ug/l	2.57E+01 lbs/day
Acrolein	8.21E+02 ug/l	6.84E+00 lbs/day
Acrylonitrile	1.51E-01 ug/l	1.26E-03 lbs/day
Benzene	3.08E+00 ug/l	2.57E-02 lbs/day
Benzidine	ug/l	lbs/day
Carbon tetrachloride	6.41E-01 ug/l	5.35E-03 lbs/day
Chlorobenzene	1.74E+03 ug/l	1.45E+01 lbs/day
1,2,4-Trichlorobenzene		
Hexachlorobenzene	1.92E-03 ug/l	1.60E-05 lbs/day
1,2-Dichloroethane	9.74E-01 ug/l	8.13E-03 lbs/day
1,1,1-Trichloroethane		
Hexachloroethane	4.87E+00 ug/l	4.06E-02 lbs/day
1,1-Dichloroethane		
1,1,2-Trichloroethane	1.56E+00 ug/l	1.30E-02 lbs/day
1,1,2,2-Tetrachloroethane	4.36E-01 ug/l	3.63E-03 lbs/day
Chloroethane		
Bis(2-chloroethyl) ether	7.95E-02 ug/l	6.63E-04 lbs/day
2-Chloroethyl vinyl ether		
2-Chloronaphthalene	4.36E+03 ug/l	3.63E+01 lbs/day
2,4,6-Trichlorophenol	5.39E+00 ug/l	4.49E-02 lbs/day
p-Chloro-m-cresol		
Chloroform (HM)	1.46E+01 ug/l	1.22E-01 lbs/day
2-Chlorophenol	3.08E+02 ug/l	2.57E+00 lbs/day
1,2-Dichlorobenzene	6.92E+03 ug/l	5.77E+01 lbs/day
1,3-Dichlorobenzene	1.03E+03 ug/l	8.55E+00 lbs/day

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1,4-Dichlorobenzene	1.03E+03 ug/l	8.55E+00 lbs/day
3,3'-Dichlorobenzidine	1.03E-01 ug/l	8.55E-04 lbs/day
1,1-Dichloroethylene	1.46E-01 ug/l	1.22E-03 lbs/day
1,2-trans-Dichloroethylene1		
2,4-Dichlorophenol	2.38E+02 ug/l	1.99E+00 lbs/day
1,2-Dichloropropane	1.33E+00 ug/l	1.11E-02 lbs/day
1,3-Dichloropropylene	2.56E+01 ug/l	2.14E-01 lbs/day
2,4-Dimethylphenol	1.38E+03 ug/l	1.15E+01 lbs/day
2,4-Dinitrotoluene	2.82E-01 ug/l	2.35E-03 lbs/day
2,6-Dinitrotoluene		
1,2-Diphenylhydrazine	1.03E-01 ug/l	8.55E-04 lbs/day
Ethylbenzene	7.95E+03 ug/l	6.63E+01 lbs/day
Fluoranthene	7.69E+02 ug/l	6.41E+00 lbs/day
4-Chlorophenyl phenyl ether		
4-Bromophenyl phenyl ether		
Bis(2-chloroisopropyl) ether	3.59E+03 ug/l	2.99E+01 lbs/day
Bis(2-chloroethoxy) methane		
Methylene chloride (HM)	1.21E+01 ug/l	1.00E-01 lbs/day
Methyl chloride (HM)		
Methyl bromide (HM)		
Bromoform (HM)	1.10E+01 ug/l	9.19E-02 lbs/day
Dichlorobromomethane(HM)	6.92E-01 ug/l	5.77E-03 lbs/day
Chlorodibromomethane (HM)	1.05E+00 ug/l	8.77E-03 lbs/day
Hexachlorocyclopentadiene	6.15E+02 ug/l	5.13E+00 lbs/day
Isophorone	2.15E+01 ug/l	1.80E-01 lbs/day
Naphthalene		
Nitrobenzene	4.36E+01 ug/l	3.63E-01 lbs/day
2-Nitrophenol		
4-Nitrophenol		
2,4-Dinitrophenol	1.80E+02 ug/l	1.50E+00 lbs/day
4,6-Dinitro-o-cresol	3.33E+01 ug/l	2.78E-01 lbs/day
N-Nitrosodimethylamine	1.77E-03 ug/l	1.48E-05 lbs/day
N-Nitrosodiphenylamine	1.28E+01 ug/l	1.07E-01 lbs/day
N-Nitrosodi-n-propylamine	1.28E-02 ug/l	1.07E-04 lbs/day
Pentachlorophenol	7.18E-01 ug/l	5.99E-03 lbs/day
Phenol	5.39E+04 ug/l	4.49E+02 lbs/day
Bis(2-ethylhexyl)phthalate	4.62E+00 ug/l	3.85E-02 lbs/day
Butyl benzyl phthalate	7.69E+03 ug/l	6.41E+01 lbs/day
Di-n-butyl phthalate	6.92E+03 ug/l	5.77E+01 lbs/day
Di-n-octyl phthlate		
Diethyl phthalate	5.90E+04 ug/l	4.92E+02 lbs/day
Dimethyl phthlate	8.03E+05 ug/l	6.69E+03 lbs/day
Benzo(a)anthracene (PAH)	7.18E-03 ug/l	5.99E-05 lbs/day
Benzo(a)pyrene (PAH)	7.18E-03 ug/l	5.99E-05 lbs/day
Benzo(b)fluoranthene (PAH)	7.18E-03 ug/l	5.99E-05 lbs/day
Benzo(k)fluoranthene (PAH)	7.18E-03 ug/l	5.99E-05 lbs/day
Chrysene (PAH)	7.18E-03 ug/l	5.99E-05 lbs/day
Acenaphthylene (PAH)		
Anthracene (PAH)		
Dibenzo(a,h)anthracene (PAH)	7.18E-03 ug/l	5.99E-05 lbs/day
Indeno(1,2,3-cd)pyrene (PAH)	7.18E-03 ug/l	5.99E-05 lbs/day

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Pyrene (PAH)	2.46E+03 ug/l	2.05E+01 lbs/day
Tetrachloroethylene	2.05E+00 ug/l	1.71E-02 lbs/day
Toluene	1.74E+04 ug/l	1.45E+02 lbs/day
Trichloroethylene	6.92E+00 ug/l	5.77E-02 lbs/day
Vinyl chloride	5.13E+00 ug/l	4.28E-02 lbs/day

**Pesticides**

Aldrin	3.33E-04 ug/l	2.78E-06 lbs/day
Dieldrin	3.59E-04 ug/l	2.99E-06 lbs/day
Chlordane	1.46E-03 ug/l	1.22E-05 lbs/day
4,4'-DDT	1.51E-03 ug/l	1.26E-05 lbs/day
4,4'-DDE	1.51E-03 ug/l	1.26E-05 lbs/day
4,4'-DDD	2.13E-03 ug/l	1.77E-05 lbs/day
alpha-Endosulfan	2.38E+00 ug/l	1.99E-02 lbs/day
beta-Endosulfan	2.38E+00 ug/l	1.99E-02 lbs/day
Endosulfan sulfate	2.38E+00 ug/l	1.99E-02 lbs/day
Endrin	1.95E+00 ug/l	1.63E-02 lbs/day
Endrin aldehyde	1.95E+00 ug/l	1.63E-02 lbs/day
Heptachlor	5.39E-04 ug/l	4.49E-06 lbs/day
Heptachlor epoxide		

**PCB's**

PCB 1242 (Arochlor 1242)	1.13E-04 ug/l	9.41E-07 lbs/day
PCB-1254 (Arochlor 1254)	1.13E-04 ug/l	9.41E-07 lbs/day
PCB-1221 (Arochlor 1221)	1.13E-04 ug/l	9.41E-07 lbs/day
PCB-1232 (Arochlor 1232)	1.13E-04 ug/l	9.41E-07 lbs/day
PCB-1248 (Arochlor 1248)	1.13E-04 ug/l	9.41E-07 lbs/day
PCB-1260 (Arochlor 1260)	1.13E-04 ug/l	9.41E-07 lbs/day
PCB-1016 (Arochlor 1016)	1.13E-04 ug/l	9.41E-07 lbs/day

**Pesticide**

Toxaphene	1.87E-03 ug/l	1.56E-05 lbs/day
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**Metals**

Antimony	35.90 ug/l	0.30 lbs/day
Arsenic	126.97 ug/l	1.06 lbs/day
Asbestos	1.80E+07 ug/l	1.50E+05 lbs/day
Beryllium		
Cadmium		
Chromium (III)		
Chromium (VI)		
Copper	3333.61 ug/l	27.80 lbs/day
Cyanide	1795.02 ug/l	14.97 lbs/day
Lead	0.00	0.00
Mercury	0.36 ug/l	0.00 lbs/day
Nickel	1564.23 ug/l	13.04 lbs/day
Selenium	0.00	0.00
Silver	0.00	0.00
Thallium	4.36 ug/l	0.04 lbs/day
Zinc		

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**Dioxin**

Dioxin (2,3,7,8-TCDD) 3.33E-08 ug/l 2.78E-10 lbs/day

**Metals Effluent Limitations for Protection of All Beneficial Uses  
Based upon Water Quality Standards and Toxics Rule**

	<b>Class 4 Acute Agricultural ug/l</b>	<b>Class 3 Acute Aquatic Wildlife ug/l</b>	<b>Acute Toxics Drinking Water Source ug/l</b>	<b>Acute Toxics Wildlife ug/l</b>	<b>1C Acute Health Criteria ug/l</b>	<b>Acute Most Stringent ug/l</b>	<b>Class 3 Chronic Aquatic Wildlife ug/l</b>
Aluminum		1334.8				1334.8	N/A
Antimony			35.9	11026.6		35.9	
Arsenic	256.4	605.3	127.0		0.0	127.0	486.0
Barium					2564.3	2564.3	
Beryllium						0.0	
Cadmium	25.5	6.7			0.0	6.7	0.9
Chromium (III)		5114.1			0.0	5114.1	350.5
Chromium (VI)	255.2	25.4			0.0	25.41	21.99
Copper	511.6	42.0	3333.6			42.0	37.6
Cyanide		39.2	564150.0			39.2	13.3
Iron		1781.2				1781.2	
Lead	255.2	299.1			0.0	255.2	15.6
Mercury		4.28	0.4	0.38	0.0	0.36	0.031
Nickel		1350.8	1564.2	11795.9		1350.8	215.0
Selenium	125.7	34.4			0.0	34.4	9.3
Silver		17.9			0.0	17.9	
Thallium			4.4	16.2		4.4	
Zinc		345.3				345.3	496.8
Boron	1923.2					1923.2	

**Summary Effluent Limitations for Metals [Wasteload Allocation, TMDL]**

[If Acute is more stringent than Chronic, then the Chronic takes on the Acute value.]

	<b>WLA Acute ug/l</b>	<b>WLA Chronic ug/l</b>	
Aluminum	1334.8	N/A	
Antimony	35.90		
Arsenic	127.0	486.0	Acute Controls
Asbestos	1.80E+07		
Barium			
Beryllium			
Cadmium	6.7	0.9	
Chromium (III)	5114.1	351	
Chromium (VI)	25.4	22.0	
Copper	42.0	37.6	

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Cyanide	39.2	13.3	
Iron	1781.2		
Lead	255.2	15.6	
Mercury	0.359	0.031	
Nickel	1350.8	215	
Selenium	34.4	9.3	
Silver	17.9	N/A	
Thallium	4.4		
Zinc	345.3	496.8	Acute Controls
Boron	1923.24		

Other Effluent Limitations are based upon R317-1.

E. coli 126.0 organisms per 100 ml

#### **X. Antidegradation Considerations**

The Utah Antidegradation Policy allows for degradation of existing quality where it is determined that such lowering of water quality is necessary to accommodate important economic or social development in the area in which the waters are protected [R317-2-3]. It has been determined that certain chemical parameters introduced by this discharge will cause an increase of the concentration of said parameters in the receiving waters. Under no conditions will the increase in concentration be allowed to interfere with existing instream water uses.

The antidegradation rules and procedures allow for modification of effluent limits less than those based strictly upon mass balance equations utilizing 100% of the assimilative capacity of the receiving water. Additional factors include considerations for "Blue-ribbon" fisheries, special recreational areas, threatened and endangered species, and drinking water sources.

An Antidegradation Level I Review was conducted on this discharge and its effect on the receiving water. Based upon that review, it has been determined that an Antidegradation Level II Review is required because the receiving water is a class 1C drinking water source.

#### **XI. Colorado River Salinity Forum Considerations**

Discharges in the Colorado River Basin are required to have their discharge at a TDS loading of less than 1.00 tons/day unless certain exemptions apply. Refer to the Forum's Guidelines for additional information allowing for an exceedence of this value.

#### **XII. Summary Comments**

The mathematical modeling and best professional judgement indicate that violations of receiving water beneficial uses with their associated water quality standards, including important downstream segments, will not occur for the evaluated parameters of concern as discussed above if the effluent limitations indicated above are met.

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**XIII. Notice of UPDES Requirement**

This Addendum to the Statement of Basis does not authorize any entity or party to discharge to the waters of the State of Utah. That authority is granted through a UPDES permit issued by the Utah Division of Water Quality. The numbers presented here may be changed as a function of other factors. Dischargers are strongly urged to contact the Permits Section for further information. Permit writers may utilize other information to adjust these limits and/or to determine other limits based upon best available technology and other considerations provided that the values in this wasteload analysis [TMDL] are not compromised. See special provisions in Utah Water Quality Standards for adjustments in the Total Dissolved Solids values based upon background concentration.

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**APPENDIX - Coefficients and Other Model Information**

CBOD Coeff. (Kd)20 1/day 2.000	CBOD Coeff. FORCED (Kd)/day 0.000	CBOD Coeff. (Ka)T 1/day 1.617	REAER. Coeff. (Ka)20 (Ka)/day 28.666	REAER. Coeff. FORCED 1/day 0.000	REAER. Coeff. (Ka)T 1/day 25.685	NBOD Coeff. (Kn)20 1/day 0.600	NBOD Coeff. (Kn)T 1/day 0.420
Open Coeff. (K4)20 1/day 0.000	Open Coeff. (K4)T 1/day 0.000	NH3 LOSS (K5)20 1/day 4.000	NH3 (K5)T 1/day 3.234	NO2+NO3 LOSS (K6)20 1/day 0.000	NO2+NO3 (K6)T 1/day 0.000	TRC Decay K(CI)20 1/day 32.000	TRC K(CI)(T) 1/day 24.433
BENTHIC DEMAND (SOD)20 gm/m2/day 1.000	BENTHIC DEMAND (SOD)T gm/m2/day 0.747						
K1 CBOD {theta} 1.0	K2 Reaer. {theta} 1.0	K3 NH3 {theta} 1.1	K4 Open {theta} 1.0	K5 NH3 Loss {theta} 1.0	K6 NO2+3 {theta} 1.0	K(CI) TRC {theta} 1.1	S Benthic {theta} 1.1

**Antidegradation Review**

An antidegradation review (ADR) was conducted to determine whether the proposed activity complies with the applicable antidegradation requirements for receiving waters that may be affected. The Level I ADR evaluated the criteria of R317-2-3.5(b) and determined that a Level II antidegradation Review is required because the receiving waterbody is classified as a 1C drinking water source.